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COUNTRY ANALYSIS BRIEFS

Angola

Last Updated: March 2008

Background

Angola, a significant Sub-Saharan Africa oil producer, joined the Organization of Petroleum Exporting Countries (OPEC) in January 2007.

Angola is the third largest oil producer in Africa behind Nigeria and Libya and is expected to have significant oil production increases in the short-term as new offshore projects come online. On January 1, 2007, Angola became the 12th member of the Organization of Petroleum Exporting Countries (OPEC) and in December of that year, received an oil production quota of 1.9 million barrels per day (bbl/d) effective January 1, 2008.

Angola is still rebuilding infrastructure destroyed during the country's 27-year civil war that came to an end in 2002. Although the country is beginning to see growth and stability, challenges persist—around 70% of the population still lives on less than US$1/day; the World Bank ranks Angola as one of the most difficult places in the world to do business as a result of cronyism and bureaucracy; and there are persistent allegations of corruption and lack of transparency in public finance.

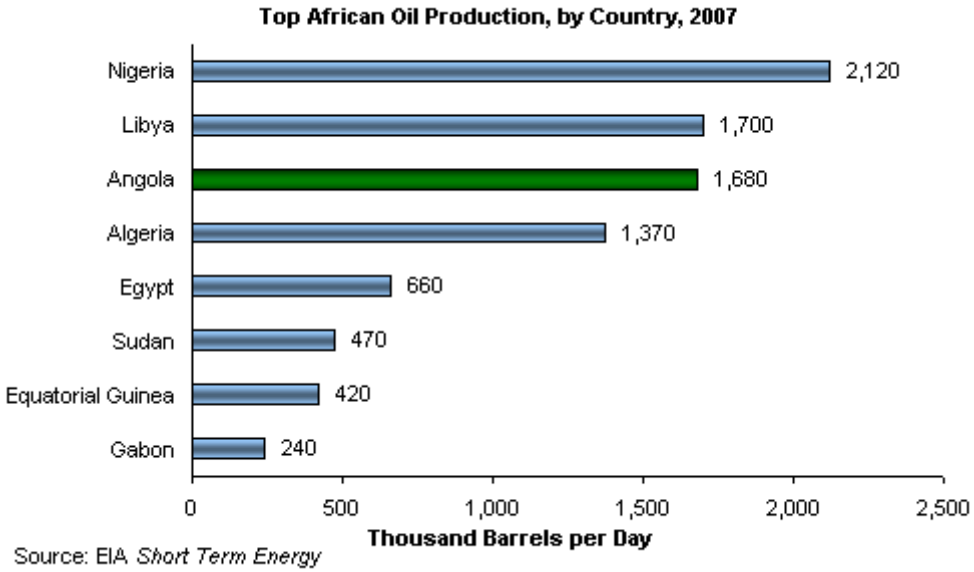
In recent years, China has agreed to provide multi-billion dollar oil-backed loans to fund infrastructure development. These loans are costly and repayment depends heavily on international oil prices. But at the same time, Chinese support has placed Angola in a position where it could break ties with the International Monetary Fund (IMF) over economic support programs that require, among other things, governance and transparency. Nonetheless, the country is experiencing high levels of foreign direct investment (FDI), particularly in the oil sector.

Oil

Angola is the third largest crude oil producer in Africa behind Nigeria and almost equal to Libya.

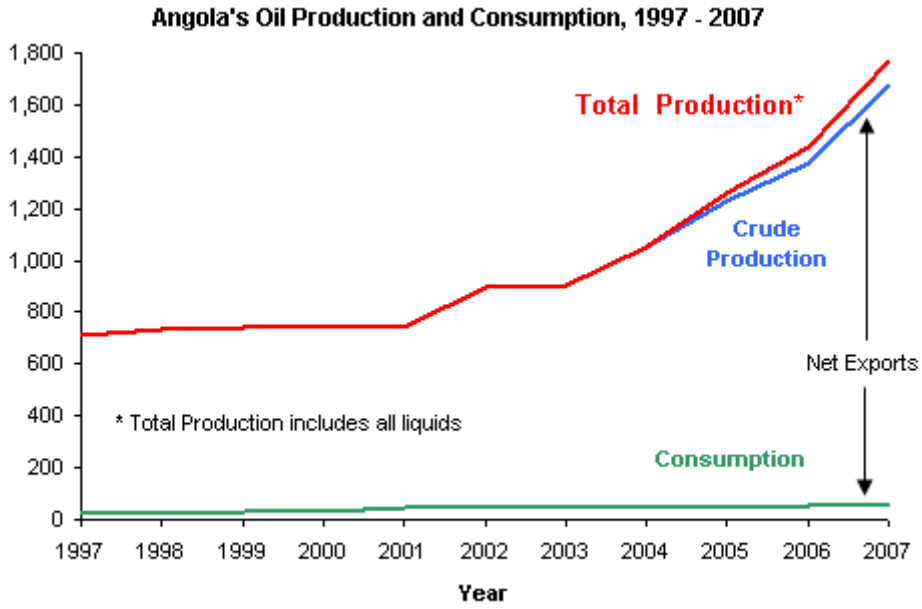
Overview

According to the *Oil and Gas Journal* (*OGJ*), Angola had proven oil reserves of 9.0 billion barrels (bbl) as of January 2008—up from 8.0 billion in 2007. The majority of the reserves are located in Angola's offshore blocks, in part because onshore exploration was limited as a result of the civil war. However, there are some proven reserves onshore near the city of Soyo and, more notably, in the disputed Cabinda enclave.



Source: EIA *Short Term Energy Outlook March 2008*

Angola's crude oil production has grown considerably over the past decade. In 1997, crude oil production averaged 710,000 barrels per day (bbl/d). Production for 2007 averaged almost 1.7 million bbl/d and capacity is expected to reach more than 2 million bbl/d in 2008, as new deep-water production sites come online.



Source: EIA International Energy Annual; Short-Term Energy Outlook

Exports

Angola exports more than 90% of its crude oil primarily to China and the US. In 2007, the United States imported approximately 496,000 bbl/d of crude oil from Angola (507,000 total oil imports), making it the sixth largest supplier of crude oil to the United States after Nigeria. For most of 2007, Angola was the second largest exporter of crude oil to China after Saudi Arabia—occasionally surpassing the kingdom. Monthly data indicates that China imported 650,000 bbl/d of Angolan crude in December 2007 (compared to US imports of 440,000 bbl/d for the same month). Other export destinations include Europe and Latin America, mainly Brazil—the fellow lusophone country is increasing political and economic links with Angola, specifically in the oil sector.

US and Chinese Imports of Crude and Products from Select African Countries

January – June 2007 (H1-07)

Thousand bbl/d	**US**	**China**
Nigeria	1,078	19
Algeria	721	26
Angola	582	465
Congo (Brazzaville)	76	99
Gabon	76	20
Chad	69	0
Equatorial Guinea	57	73
Cameroon	28	0
Sudan	0	213
Sources: EIA for US Data; Energy Compass October 2007 for China data		

Sector Organization

In 1976, the Angolan government created a national oil company (NOC) called the Sociedade Nacional de Combustiveis de Angola (Sonangol). In 1978, Sonangol became the sole concessionaire for oil exploration and production in Angola. Sonangol works with foreign companies through joint ventures (JVs) and production sharing agreements (PSAs), while funding its share of production through oil-backed borrowing. Major international oil companies (IOCs) operating in Angola include BP, Chevron, Eni, Total, ExxonMobil, Devon Energy, Maersk, Occidental, Roc Oil, and Statoil. China's Sinopec is one of the newer international companies operating in Angola and is proving to be an important player in terms of development aid, oil backed loans and trade.

Production

Oil production in Angola is concentrated in numerous onshore and offshore blocks. The offshore blocks are divided into three bands; (band A) shallow water blocks 0-13; (band B) deepwater blocks 14-30; and (band C) ultra-deepwater blocks 31-40. Additional blocks are now being designated in the ultra-deepwater offshore lower Congo Basin, three of which are being offered in Angola's current licensing round (see below).

Blocks 15 and Zero have been the most prolific offshore blocks. The majority of Angolan oil is medium to light crude (30 degrees – 40 degrees API) with low-sulfur content (0.12 percent - 0.14 percent).

Despite the expense of developing the deepwater and ultra-deepwater fields, Angolan oil production has grown rapidly over the past decade and will continue to do so in the short-term. Industry analysts (Wood Mackenzie/Petroleum Intelligence Weekly) estimate that at current reserve/production ratios, total production capacity will peak at around 2.5 million bbl/d in 2011, before slipping to 2.4 million bbl/d by 2013.

Onshore

Onshore exploration and production activities have mainly focused around the Cabinda Province and were halted during Angola's civil war. The Cabinda province is home to separatist movements demanding access to oil revenues and greater participation in oil policy. While the government has appointed members to political positions, and security has improved, clashes still occur between the military and rebels in the area. Some existing wells that were drilled prior to the war and the neighboring Block Zero have proven to be extremely successful (see below). The current licensing round is offering three onshore blocks, Cabinda Centro in the Cabinda Province and two blocks in the onshore Kwanza Basin.

Block Zero

Block Zero is located offshore Cabinda province and accounted for approximately 370,000 bbl/d of production in 2007. Cabinda Gulf Oil Company (CABGOC), a Chevron subsidiary and operator of Block Zero since 1955, has a 39.2 percent share in the JV. In May 2004, Sonangol and the Angolan government extended CABGOC's contract, which was set to expire in 2010, to 2030. Other partners include Total and Eni. Block Zero's largest producing oil fields are Takula (Area A), Numbi (Area A), and Kokongo (Area B).

In 2005, Chevron brought online the Sanha field gas complex and Bomboco oil field. Production from the fields, which includes oil condensate and liquefied petroleum gas (LPG), is estimated to have peaked at a combined total of 100,000 bbl/d in 2007.

Block 14

In addition to Block Zero, CABGOC is the operator of deepwater Block 14 with 31 percent interest and is joined by partners Eni, Sonangol, Total and Petrogal. A total of ten discoveries have been made on the block with Kuito being the first in 1997. In January 2000, CABGOC announced full production (80,000 bbl/d) at its Kuito field, but current production levels have declined to an estimated 55,000 bbl/d. The quality of Kuito crude is poor when compared with other Angolan crudes and usually trades at a $5 per barrel discount.

In January 2006, CABGOC brought online the first phase of the Benguela, Belize, Lobito, Tomboco (BBLT) project. Oil production from BBLT is expected to peak at 200,000 bbl/d by 2008.

In June 2006, CABGOC brought online its Tombua/Landana joint development, with production expected to be onstream in 2009 and peak at 100,000 bbl/d by 2010. Additional fields still being evaluated include Gabela, Negage and Lucapa.

Block 15

ExxonMobil is operator of Block 15, the largest producing deepwater block in Angola along with partners BP, Eni and StatoilHydro. Block 15 has estimated recoverable hydrocarbon reserves of 4.5 billion bbl, and at peak production, Block 15 is expected to exceed 800,000 bbl/d.

In 2003, ExxonMobil brought online *Xikomba* field, with estimated recoverable reserves of 100 million bbl. Production from Xikomba is currently 70,000 bbl/d.

In August 2004, the first of the **Kizomba** developments, four floating, production, storage and offloading (FPSO) facilities were brought online and are estimated to peak at a combined 750,000 bbl/d.

· The *Kizomba-A* project, which includes the Chocalho and Hungo fields, currently produces 250,000 bbl/d.
· The *Kizomba-B* project, brought online in 2005 includes the Dikanza and Kissanje fields. Kizomba-B contains an estimated one billion bbl of recoverable oil reserves and currently produces around 250,000 bbl/d.
· The *Kizomba-C* project, currently under development, will produce oil from the Batuque, Mondo and Saxi fields. Production at the Mondo field came onstream in January of 2008 and the other Kizomba C fields are expected onstream in mid-to-late 2008 with a combined peak of 200,000 bbl/d.
· The *Kizomba-D* fields are expected onstream after 2011 with a peak production capacity of 120,000 bbl/d. There is potential for added production from surrounding satellite fields expected onstream after 2010 that could produce an additional 125,000 bbl/d.

Block 17

Total operates Block 17 with a 40 percent share, while Sonangol is its franchise holder. Other shareholders include ExxonMobil, BP, Statoil and Norsk Hydro.

In December 2001, Total brought online the Girassol oil field, an FPSO with a production capacity of 250,000 bbl/d. In 2003, the Jasmin satellite of Girassol came online and is helping to maintain current Girassol production levels. A second satellite, Rosa, came onstream in 2007 and will also help maintain production at Girassol.

In December 2006, Total brought online the 225,000 bbl/d Dalia field. Development of Dalia included a FPSO with a 240,000 bbl/d processing capacity and a 2-million-barrel storage capacity. Dalia's recoverable reserves are estimated at 1 billion barrels.

Future projects on Block 17 include Pazflor, which will produce an estimated 200,000 bbl/d starting in 2010, and Clov, which will produce 150,000 bbl/d starting in 2011. By 2012, Total expects average production on Block 17 to be 850,000 bbl/d.

Block 18

The Greater Plutonio field (BP operated) came online in 2007 at 100,000 bbl/d and is expected to reach peak production of 200,000 bbl/d by 2008. The field consists of six fields: Platina, Plutonio, Galio, Paladio, Cromio and Cobalto.

Angola's Upcoming Oil Projects

Project	Location	Operator	Peak Production (estimate)	Expected Start-up
Tombua Landana	Block 14	Chevron (CABGOC)	130,000	2009
Negage	Block 14	Chevron	75,000	2009

Pazflor	Block 17	Total	200,000 bbl/d	2010
Block 31 project	Block 31 NE	BP	130,000 bbl/d	2011+
Block 31 project	Block 31 SE	BP	130,000 bbl/d	2011+
Block 18	Block 18W	BP	100,000 bbl/d	2011+
Kizomba D	Block 15	Exxon	120,000	2011+
Clov	Block 17	Total	150,000 bbl/d	2011-planned
Block 32 project	Block 32	Total	130,000 bbl/d	2011-planned
Sources: *Afroil*, BP, *International Oil Daily*, *Petroleum Intelligence Weekly*, *Reuters*, Total, *Upstream* , *Petroleum Economist*				

Exploration

Licensing Rounds

Success in offshore discoveries in Angola has led to increased interest in Angola's exploration blocks. In August, 2007 Sonangol announced a new licensing round with 10 blocks on offer described below (click here to view Sonangol's concession map):

Cabinda Central: located in the onshore Congo Basin. This block has been unexplored since the beginning of the civil war. According to the *Petroleum Economist* there is some uncertainty surrounding this block as it is licensed to a Devon Energy group but the license was frozen in force majeure until security improved. This block is adjacent to Chevron's offshore Block Zero.

Kwanza Blocks 11 and 12: These blocks are located onshore in the Kwanza Basin South of Luanda.

Block 9: Located offshore in the Benguela Basin covering both shallow and deep waters.

Blocks 19, 20 and 21 are located in the deepwater Kwanza Basin.

Blocks 46, 47 and 48 are ultra-deepwater blocks, sometimes referred to as ultra-ultra-deep, reaching depths of approximately 8,200 feet (2,500 meters). Block 46 overlaps waters that are being contested by Congo-Brazzaville.

Refining and Downstream

Domestic oil consumption in 2007 was approximately 60,000 bbl/d. There is one refinery in Luanda, Fina Petroleos de Angola –a JV between Sonangol, Total and private investors. The refinery has a crude oil processing capacity of 39,000 bbl/d and produces some of Angola's domestic product requirements. The remaining demand is met by imports of gasoline, jet fuel, kerosene, distillate fuel oil, LPG and other products.

Angola is developing plans for a new 200,000 bbl/d refinery, SonaRef, in the coastal city of Lobito. The $3.5 billion project was initially to be built in partnership with Sinopec but the Chinese company withdrew as a result of disagreements regarding the market for products—Sinopec wanted to supply China while Sonangol wants to sell the products domestically and to African markets. Sonangol is now proceeding with the SonaRef project and is expecting to begin construction in 2008 with refining to start by 2012. The new refinery will be able to process heavy crudes, such as those found in the Kuito and Dalia fields. Since the cessation of armed hostilities in 2002, the domestic demand for oil products is rising.

Natural Gas

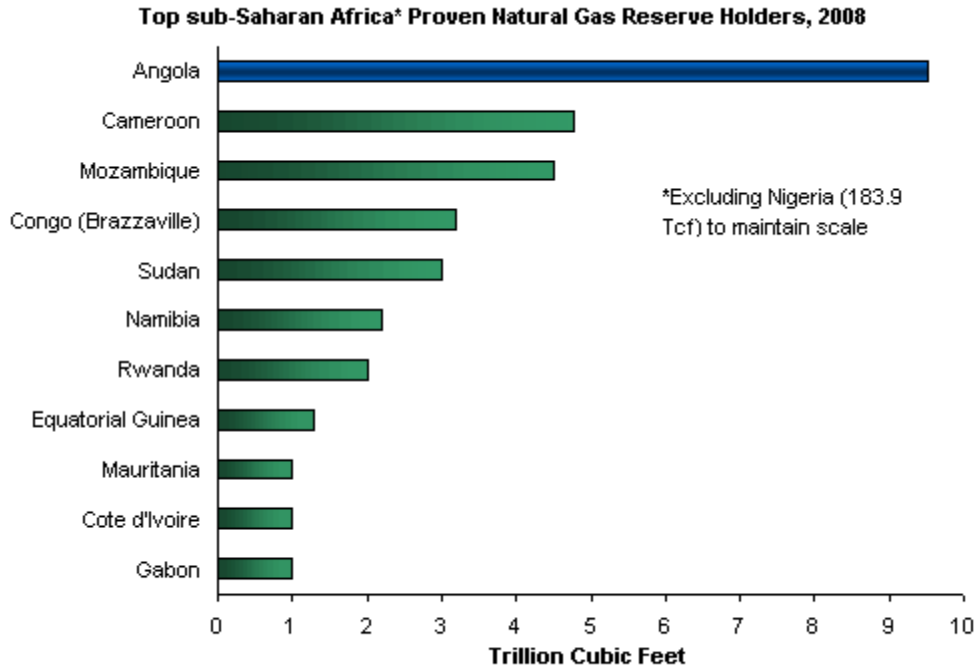
Angola currently flares the majority of its natural gas but plans are underway to convert natural gas into liquefied natural gas (LNG).

According to the *Oil and Gas Journal* (*OGJ*), Angola has 9.5 trillion cubic feet (Tcf) of natural gas reserves as of January 1, 2008—a significant increase from the 2007 estimated reserves of 2 Tcf.

According to EIA statistics, in 2005, Angola's gross natural gas production was approximately 300 billion cubic feet (Bcf). Of this, 224 Bcf (75%) was vented or flared, 42 Bcf (14%) was re-injected to aid in oil recovery and 34 Bcf (11%) was marketed. From the marketed share, 5 Bcf was processed into liquefied petroleum gas (LPG) and the remaining 28 bcf was for domestic consumption.

With the considerable increases in proved natural gas reserves and government policies to end natural gas flaring, plans are underway to convert much of the natural gas into LNG for export with

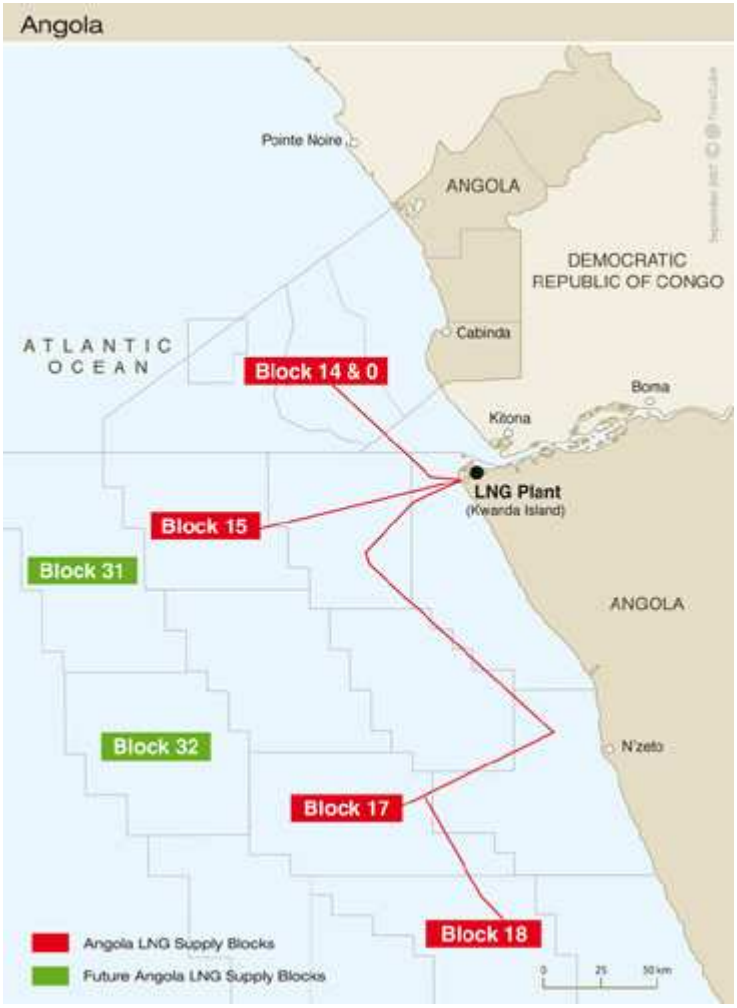
some to be used for domestic electricity production.



Source: *Oil and Gas Journal*

Liquefied Natural Gas (LNG)

Chevron and Sonangol together with other shareholders including Total, BP and Eni are planning to build a five-million-ton LNG plant, which could be operational in 2010, when the zero gas flaring policies take effect. ExxonMobil had transferred its share in the Angola LNG project to Sonangol, temporarily giving the NOC and Chevron equal share holdings of 36.4%. However, in April of 2007, Sonangol signed an MoU with Eni to give them a 13.6% share.



Source: Total Corporate Website

The natural gas is expected to come from several offshore fields including Total's Block 17, BP's block 18 and Chevron's blocks Zero and 14. According to Eni the project will produce a total of 128 million metric tons of LNG, 104 million barrels of condensate and 257 million barrels of LPG over a 28 year period. The LNG facility is expected to receive 1 billion cubic feet per day of natural gas and produce over 4 million tons per year of LNG for export plus up to 125 million cubic feet for domestic needs. The LNG is to be directed to the US market, currently intended for the regasification plant at Pascagoula on the US Gulf Coast.

Electricity

Electric power in Angola is available to less than 20 percent of the population.

As of 2005, Angola had 0.8 gigawatts (GW) of installed electric generating capacity. Angola generated 2.6 billion kilowatthours (Bkwh) in 2005, while consuming 1.7 Bkwh. Approximately 67 percent of generated electricity comes from hydroelectric plants and the remaining 33 percent from conventional thermal sources such as diesel generators. Less than 20 percent of Angola's population has access to electric power, and blackouts occur frequently. The sector suffers from war-torn infrastructure that will continue to be a challenge to national reconstruction and development in the near future. Domestic heating and cooking needs are generally met through biomass in the form of fuel wood and charcoal.

Sector Organization

The electricity sector is operated by the state utility, Empresa Nacional de Electricidade (ENE). Three separate electrical systems are used to supply electricity throughout Angola. The Northern System supplies the provinces of Luanda, Bengo, Kuanza-Norte, Malange and Kuanza-Sul. The Central System provides for the provinces of Benguela, Huambo and parts of Bie. The Southern System supplies to Huila and Namibe provinces. The government aims to link the systems there to create a national grid through the South Africa Power Pool (SAPP). Industry experts have suggested that Angola needs to ease state controls on electricity prices and offer incentives to attract private investment.

Hydroelectricity

Hydroelectric facilities generate around two-thirds of Angola's electricity. The Matala dam, which began operations in 2001 on the Cunene River, is the main source of electricity in southwest Angola. The Cambambe dam (180 MW) on the Kwanza River, the Mabubas dam (17.8 MW) on the Dande River, and diesel generators are the main sources of electricity in northern Angola. In northeastern Angola, Russian-based Alrosa Vneshtroy LDA is building the Chicapa hydroelectric dam (16 MW capacity) on the Tchicapa River, which is due to begin operations in March 2008.

Odebrecht, a Brazilian construction company, has partially completed the construction of a hydroelectric facility at Capanda on the Kwanza River. Work on the 520-MW plant began in the mid-1980s, but was suspended due to the civil war. The first of four planned hydraulic turbines began generating electricity (260 MW) in January 2004. Russian-based, Technopromexport, installed the second phase (260 MW) in mid-2007. In addition to second phase construction, new transmission lines are being built to carry power generated by the dam. The completed Capanda project will nearly double Angola's electricity generating capacity.

Nuclear

The Angolan Government is planning to utilize national uranium deposits to develop a nuclear energy industry. This potential source of electricity is still in its planning phase. To date, there has been some discussion with the Chinese government regarding training and the construction of a nuclear plant in Angola but no progress has been made.

Profile

Energy Overview

Proven Oil Reserves (January 1, 2008E)	9.0 billion barrels
Oil Production (2007E)	1.7 million barrels per day (1.4 Mbbl/d 2006E)
Oil Consumption (2006E)	56 thousand barrels per day
Crude Oil Refinery Capacity (2007E)	39 thousand barrels per day
Proven Natural Gas Reserves (January 1, 2008E)	9.5 trillion cubic feet (2007E at 2 tcf)
Natural Gas Production (2006E)	28 billion cubic feet
Natural Gas Consumption (2006E)	28 billion cubic feet
Recoverable Coal Reserves	None
Coal Production	None
Coal Consumption	None
Electricity Installed Capacity (2005)	0.8 gigawatts
Electricity Production (2005)	2.6 billion kilowatt hours
Electricity Consumption (2005)	2.2 billion kilowatt hours
Total Energy Consumption (2005)	0.15 quadrillion Btus*, of which Oil (69%), Natural Gas (20%), Hydroelectricity (11%), Coal (0%), Nuclear (0%), Other Renewables (0%)
Total Per Capita Energy Consumption (2005)	12.8 million Btus
Energy Intensity (2005)	3,675 Btu per $2000-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2005)	20.39 million metric tons
Per-Capita, Energy-Related Carbon Dioxide Emissions (2005)	1.74 metric tons
Carbon Dioxide Intensity (2005)	0.7 Metric tons per thousand $2000-PPP**

Oil and Gas Industry

Organization	State-owned Sociedede Nacional de Combustiveis de Angola (Sonangol) oversees offshore and onshore oil operations in Angola
Major Oil/Gas Ports	Luanda, Malango (Cabinda), Palanca, Quinfuquena

Major Refinery	Fina Petroleos De Angola – Luanda

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

Links

EIA Links

EIA - Country Information on Angola

U.S. Government

CIA World Factbook - Angola
U.S. Agency for International Development: Angola
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Stanford University African Studies: Angola
Strategic Road: Angola
University of Pennsylvania African Studies: Angola
Washington Post World Reference: Angola

Associations and Institutions

African Development Bank: Angola
African Union (formerly Organization of African Unity)
Development Bank of Southern Africa
International Monetary Fund (IMF): Angola
National Bank of Angola
SADC Central Banks Website
Southern African Development Community (SADC)
World Bank: Angola

National Links

Official Angola Website
Sonangol (National Oil Company)

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Global Insight
Global Witness
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International Oil Daily
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World Markets Analysis

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